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PATENT SPECIFICATION

NO DRAWINGS

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COMPLETE SPECIFICATION

Foodmix

I, DAVID WEINSTEIN, of 6411, Laurel Drive, Baltimore, Maryland, United States of America, a citizen of the United States of America, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed to be particularly described in and by the following statement:—

The present invention relates to an improved method and means for the instantaneous preparation, particularly in the home but also institutionally or for on-location consumers, of a soft form-retaining mass of a whipped aqueous ice cream, ice milk or sherbet mix. In particular the invention provides confectionary food packages in which the components of novel ice cream, ice milk or sherbet mixes are contained under the pressure of a gaseous propellant which is partially dissolved in the mix. When required for use the mix is discharged from the container by the pressure of the gas and is at the same time whipped by the latter so as to form an expanded mass, which can then be frozen to form an ice cream, ice milk or sherbet type of product, by which is meant a product which is outwardly very similar to the usual commercially available ice cream, ice milk or sherbet products in spite of the high degree of expansion or overrun which is used.

By "overrun" there is meant the percentage increase in volume over that of the aqueous mix. When applying the invention this may be at least twice the usual overrun which has been obtained in the past; in the case of ice cream and ice milk, an overrun of at least 160% or, better still, 200% or even higher is preferred. The whipped mixes and the products obtained on freezing then have a body, texture and general palatability which can be at least equal to those of conventionally prepared ice creams, ice milks and sherbets, despite their increased volume and lower specific weight.

[P ... .]

By applying the invention, the above mentioned aqueous mixes are caused to be whipped by the gas or gases dissolved therein, when they are discharged from pressurized containers in which the mixes are packaged. A heretofore unattained high overrun for ice cream, ice milk and sherbet products is possible, accompanied by stability at room temperature and on freezing, by a satisfactorily firm body in contrast to the fluffy and foamy products heretofore obtained on high overruns, and by feel, flavour, taste and general palatability which are comparable to those of a superior grade of ice cream, ice milk or sherbet as conventionally prepared. In this way there are obtained, instantaneously, soft confections in a most convenient, expeditious and economical manner and which, on freezing, yield products having a desirably firm body combined with smoothness of texture, in the case of ice cream and ice milk, and pleasing feel, flavour and chewability together with a reduced caloric content per unit volume, the products being at the same time free from defects which are commonly encountered in the standard ice creams, ice milks and sherbets, and which would reasonably be expected in an even greater degree from the nature of the compositions of the invention and their departures from known mixes.

The invention will first be described in connection with the preparation and properties of ice cream mixes and their packaging in pressurized containers and conversion into whipped soft and frozen confections; variation required for ice milk and sherbet mixes will be described later.

An icecream mix must satisfy a large number of requirements to gain consumer favour and to meet legal standards, and it represents a complex mixture of various components whose nature and proportions are so selected as to impart certain desirable qualities

and avoid various possible defects in the frozen product; to the end, a proper balance must be maintained among the various components.

Also, one of the most important limitations that ice cream manufacturers must observe is the total solids content of the aqueous mix, which is usually 36% to 39% and rarely is 1% or 2% higher. Thus, as pointed out on page 31 of Frandsen and Arbuckle, "ICE CREAM AND RELATED PRODUCTS", The Avi Publishing Company, Inc., Westport, Connecticut 1961, "A heavy, soggy product results when the total solids content is too high, usually when above 40 to 42 per cent".

The present invention is based on the conception that it would be desirable to provide simple and economical means for preparing a frozen confection, especially in the home, that has all of the properties of a superior grade of ice cream, but is whipped to a heretofore unattained overrun, preferably 200% and above (i.e., three or more times the volume of the original aqueous mix), so that the whipped and ultimately the frozen confection contain a considerably lower weight of total solids per unit volume than standard ice creams. Thereby a product of lower cost per unit volume is obtained and at the same time, one that meets the needs of "weight watchers", to whom a serving of an ice cream product of a volume equal to a serving of standard ice cream, but having a much lower caloric content, will greatly appeal.

However, a useful higher overrun cannot be attained by simply increasing the whipped-up volume of standard mixes, for then a fluffy, snow-like, unpalatable product is obtained. Prior teachings are to the effect that difficulties will be encountered if it is attempted to increase the content of various components of standard formulations in the effort to obtain a satisfactory product at higher overruns. Thus the skim milk solids content must not be increased, for that would increase the tendency to lactose crystallization, which produces "sandiness". In fact, so serious is the problem of sandiness caused by crystallization of lactose, that it has led to the use of delactosed milk solids-not-fat (skim milk solids). In addition, the cane sugar content must be maintained within certain limits, not only to avoid excessive sweetness, but also because the sugar depresses the freezing point, and thus makes freezing more difficult.

Also, in the replacement of a part of the sucrose in ice cream mixes with corn syrup solids, Frandsen & Arbuckle, *supra*, recommend (page 50 that such solids be limited to from one-fourth to one-third of the sugar content. Prior art teachings are clearly to the effect that the overrun must be limited to a value below 100%; and that only rarely can it be allowed to go slightly above this figure.

It is also known that the higher the total solids content of the mix, the lower is the degree of whipping that can be obtained by the heretofore usual methods of whipping ice cream mixes, so that it would be exceedingly difficult, if not impossible, to obtain an overrun of the order of 200% with increase of the total solids content to make up for the desired volume increase by the procedures heretofore employed, as by mechanical whipping.

It is further known that if the heretofore produced soft ice cream is frozen in a home freezer, especially if it has been exposed to room temperature even for a short time, it becomes sticky and gummy, and also very hard, so that it no longer has the character of ice cream. This occurs also if frozen ice cream is allowed to stand at room temperature, so that it partially melts, and is then re-frozen.

Another consideration that cautioned against increase of the solids content was the fact that increase of the solids content necessarily reduces the water content, so that the concentration of the sugar would be increased thereby. This would result in a lowering of the freezing point and make freezing more difficult. Yet despite such lowering of the water content, the intermediate (soft) products of my present invention can be frozen at the temperature of the home freezer and do not require the lower temperatures used commercially.

I have found that a number of prior practices and precautions must be violated and the mixes unbalanced to produce novel ice cream mixes which, on whipping by a gas or gases dissolved therein and on discharge from a pressurized container, yield products of most pleasing character, and which can be termed an "instant ice cream" (or "instant" ice milk or sherbet). These products, despite a greatly reduced specific gravity, i.e., a low weight per gallon or litre, nevertheless, both in the chilled intermediate state and on freezing, have a most desirable body, texture, feel, taste and other essential properties of a superior ice cream-like confection and are remarkably free from the defects and disadvantages which would be predictable from prior knowledge and experience.

I have discovered that, despite increase of the solids content of ice cream mixes in accordance with the invention, a far higher overrup (160% to above 250%) can be obtained by dispensing from a pressurized container having therein a soluble gas, than by the commonly employed commercial methods of whipping; that despite increase of the skim milk solids (and hence of lactose), in the ice cream and ice milk mixes and even on an

addition of lactose to the mix, but for reasons not yet fully understood, the whipping action of the expanded dissolved gases prevents the expected crystallization of lactose (the cause of sandiness); that despite increase of corn syrup solids, the texture and body of the expanded mix have proved to be highly satisfactory and the whipping is not interfered with; that despite increase of the content of sweetening agents, sugar crystallization does not occur and moderate freezing temperatures are adequate; and that despite a much lower proportionate increase in the total solids content than the degree of overrun, a soft mass is obtained on discharge from the pressurized container which has a body comparing favorably with that of the known soft ice creams, in spite of the latter's much larger content of solids per unit of volume, and which has a firmness superior to that of the known soft ice cream. In fact, the added lactose has been found not only not to crystallize, but to contribute to the retarding of the melting of the soft and frozen products.

Pursuant to the invention, intermediate soft confections of a unique combination of properties are obtained on discharge from an aerosol container at an overrun of 160% to 250% for ice cream and ice milk mixes and 80% to 140% for sherbet mixes (as contrasted with the commercially obtainable overruns for ice cream, ice milk and sherbet mixes of respectively, about 60% to 100%, 40% to 80%, and 30% to 50%). The soft ice cream and ice milk products have an extremely smooth, mousse-like texture, combined with pleasing taste and feel and a firm, shape-retaining body, even though the increase in solids content is only about 10% to 25% over standard mixes, far less than the increase in volume.

The intermediate soft products, especially when discharged from a chilled container, can be eaten as such. They melt only very slowly, and even after standing at room temperature for an hour or more, they retain their volume and shape and do not show any separation of liquid (i.e., there is no "bleeding"). The whipped-up masses accordingly afford the housewife many opportunities for exercising her ingenity to produce unusually flavoured and enriched semi-frozen and frozen confections, which cannot be done with partially melted (and thereby softened) frozen conventional ice creams and ice milks, or with soft ice creams, because these, on re-freezing, become sticky and gummy. The intermediates of the present invention, on the other hand, are discharged from the pressurized container (chilled or not) at a uniform consistency and temperature, do not melt readily, and can be mixed with different flavours and fillings, such as roasted coffee bean or instant coffee powder, powdered cinnamon, fresh, dried or glacé fruits, and nuts; the mixture is then frozen in the home freezer. Successive portions of the whipped mix can be differently treated, so that the same pressurized container can be used to yield different frozen confections. This can be done also in institutions and in restaurants for immediate use or for immediate freezing.

Even in the unfrozen condition, and despite its reduced weight per unit volume, the soft intermediate product is characterized by satisfactory body and a pleasing feel and taste; when frozen, it is comparable to a high grade ice cream. When dispensed from a chilled container, it provides an instant soft ice cream and is the only product of this type which can be prepared in the home without a great deal of labour and mechanical equipment. Even after standing at room temperature for some time, it can, unlike conventional ice cream, be frozen from the soft condition without the appearance of crystallization, gumminess or stickiness. The smoothness of texture is retained even after freezing, there being no ice or sugar crystals in the frozen product, which acquires a degree of stiffness, has a pleasing chewability, and is of highly palatable quality.

The stream of whipped ice cream can be used, as it emerges from the nozzle of the, preferably chilled, pressurized container, as topping for fruits, cakes, pancakes, waffles, crepes, conventional ice cream sundaes, as well as other prepared food dishes, and it is superior to whipped cream when used in coffee. In these uses, it is desirable to avoid too large a proportion of corn syrup solids. In the absence of heat, the chilled topping retains its shape for as much as $1\frac{1}{2}$ hours at room temperature and, in contrast to whipped cream, it can be partially or completely frozen to yield tasteful and palatable confections. The unfrozen mousse-like confection discharged from the pressurized container also provides an interesting, as well as tasty and nutritious, food for infants and children to whom frozen products are preferably not given; for them the confections are desirably made with sterilized mixes.

Whereas commercial ice cream must be frozen at a temperature at least as low as −10°F (−23.3°C) and usually at −20°F (−28.9°C.) the whipped intermediate products of the present invention can be frozen to a satisfactory hardness in the freezer compartment of a household refrigerator, which is usually at a temperature of about 0° to 5°F. (−17.8° to −15.0°C).

In my improved compositions, corn syrup solids may be employed to replace part of the sucrose to an extent as high as 40% or more. These solids contribute to the body and chewability of the frozen confection and cause no difficulty in the whipping by expansion of dissolved (or suspended) gas.

A small amount of either sodium caseinate

or of an edible calcium salt of low solubility, or both, are preferably employed in the mixes, especially the ice cream and ice milk mixes, as they add to the stiffness and body of the product. Among the calcium salts that may be used are the lactate, gluconate, citrate and sulphate.

My improved mixes, even though they contain only about a 10% to 25% increase in solids content over conventional formulations, nevertheless yield an expanded mass of satisfactory body and of a delicious feel and flavour, despite an increase in volume of at least twice that of prior methods of whipping and even 3 or more times the volume of the aqueous ice cream or ice milk mix.

When the contents are pasteurized, the pressurized container can be stored at room temperature for a considerable period, and in the refrigerator for about 6 months; when sterilized, the contents remain fresh indefinitely.

What has been said hereinabove with regard to ice cream applies in general also to ice milk, which differs from ice cream principally in a lower fat content. In sherbet mixes, there must be provided the minimum acid requirement of 0.35% calculated as citric acid. The sugar and stabilizer contents can be adjusted to produce the texture and consistency characteristic of the known sherbets.

Although the examples hereinbelow employ heavy cream (butterfat) as the source of fat, it will be understood that other animal fat or vegetable fat can be used in place of all or part of the heavy cream.

It will be seen from the foregoing that the invention provides for the use of a pressurized container which is only a fraction of the volume of the whipped-up product obtained from it. It enables a householder to prepare instantly and easily a fresh quantity of the desired amount of soft confection, which can then be quickly frozen. This affords the additional advantage that the demand on the capacity of the freezer is reduced.

The maximum solids content that has heretofore been considered possible or practical in commercial ice cream manufacture has been 36.5% for a 10% fat content and 42% for a 16% fat content (all percentages herein are by weight), the latter values giving a rather heavy and soggy product. The usual compositions for commercial ice creams are within the following ranges: Butterfat, 10% to 16%; Skim Milk Solids, 8% to 11%; Sugar, 13% to 17%; Stabilizer, 0.25% to 0.5%; and Emulsifier, 0.25% to 0.5%.

The usual compositions for Ice Milk contain the following: Butterfat, 2% to 7%; Skim Milk Solids, 10% to 13%; Sweetening Agents, 14% to 17%, the total solids content being 29% to 37%.

Sherbets usually have the following composition: Butterfat, 2%; Skim Milk Solids, about 5%; and Sugar, 25% to 35%. The total solids content amounts to 32% to 42%.

In accordance with the invention, the total solids content has been increased for ice cream mix to a value in the range from 43% to 54%. For Ice Milk the value is from 37% to 47%; and for sherbets it is from 42% to 59%.

Formulations exemplifying the present invention may include the following components: For ice cream mix: Butterfat, 10% to 16%; skim milk solids, 11% to 17%, sweetening agent, 17% to 25%, lactose (in the absence of a bulky flavoring agent like cocoa, 2%, with a total solids content of 43 to 54%. For Ice Milk, butterfat is 3 to 7%; skim milk solids, 15 to 17%; sweetening agents, 18 to 24%. For Sherbets, butterfat is 2%; skim milk solids, 5%; sweetening agents, including corn syrup solids, 42%—52%.

The percentage of butterfat and skim milk solids in sherbet mixes is limited, as above indicated, and I increase the solids content by increasing the amount of sweetening agent and using a considerable proportion of corn syrup solids. I can increase the solids content by adding lactose (which has a lower sweetening effect than sucrose); thus I may add 2% lactose to the formula of Example 3 below, and reduce the proportion of water correspondingly.

A stabilizer is used in the proportion by weight of about 0.1% to 0.5%; and the emulsifier amounts to about 0.1% to 0.2%. The mixes may also contain standard flavouring agents, such as vanilla or chocolate. Fresh, sweet cream is the most desirable concentrated source of butterfat for use in the mixes. However, unsalted butter and butter oil may also be used. If a product containing vegetable fat is desired, partially hydrogenated vegetable oil or other acceptable non-animal fats may be used.

The use of high heat skim milk solids (i.e., one produced by spray drying at temperatures of 190°F. or above) is of advantage and these constitue at least part of the milk solids.

The usual diabetic ice cream mix contains: Butterfat, 16%; Skim Milk Solids, 7% to 10%; Sorbitol, 7% to 9%, with a total solids content of 30 to 35%. In my improved diabetic mix, the butterfat remains the same, but the skim milk solids are increased to 10.4% to 14%, and the sorbitol to 14% to 18%, while the total solids are increased to 40.4% to 48%.

The usual or standard diatetic ice cream mix includes butterfat, skim milk solids, and crystalline sorbitol; and has a total solids content of 25% to 32%. In my improved mix, the total solids are increased to 33% to 42% and include additionally gum arabic or other vegetable gum.

Various kinds of sweetening agents may be used, including cane and beet sugar, corn syrup and its solids, and lactose. In diabetic mixes, sugar substitutes, like sorbitol, can be used, as well as synthetic sweeteners.

The emulsifiers can be those commonly used in commercial ice cream manufacture, such as mono- and di-glycerides of the higher fatty acids, as well as sorbitan and polyoxyethylene derivatives. A highly satisfactory emulsifier is one known as "TM 100VS", which is a mixture of 80% mono- and diglycerides and 20% polyoxyethylene sorbitan stearate. Egg yolk can also be used. These have been found to provide uniform whipping action and yield a product with smoother body and texture.

The stabilizers aid in preventing formation of objectionably large ice crystals. They include seed gums, such as locust bean gum, gelatin (0.3% to 0.5%) seaweed derivatives, carrageenins and cellulose gums.

In packaging the mixes in pressurized containers, they are charged into the container in an amount insufficient to fill it. The gas or mixture of gases is then introduced into the container under a pressure such that the gas or vapour pressure at room temperature is about 80 to 100 lbs./sq. in (5.62 to 7.03 kg./cm.). The gases which may be used include nitrous oxide, carbon dioxide, non-toxic polyfluoro- and poly-(chloro-fluoro)-lower alkanes, like monochloro- pentafluoroethane ("Freon 115"), and octafluoro-cyclobutane, or any other gases suitable for admixture with foods, alone or in admixture with one another. Preferably, if a combination of nitrous oxide and carbon dioxide is used, the amount of carbon dioxide is less than about 30% of the total gas mixture. Similarly, when a mixture of nitrous oxide and "Freon 115" is used, it is preferred to employ a mixture containing about 70% nitrous oxide and 30% of the "Freon 115" "Freon" is a Registered Trade Mark.

It is desirable to provide in the aerosol can a reservoir of liquefied gas which will evaporate as the volume of liquid mix falls and the pressure likewise tends to fall, so that adequate pressure is maintained. With a mixture of 75% "Freon 115" and 25% "Freon 218" in liquid form (the latter acting to depress the vapour pressure of the former) is used, a larger proportion of the contents of the pressurized container can be discharged under high pressure. The proportions of the "Freon 115" and "Freon 318" can also be 60:40 or 50:50 by weight.

The gases and their proportions are so selected as to provide the stated pressure at room temperature. The "Freon" gases mentioned can be mixed with nitrous oxide and the latter can sometimes be used alone. Usually about 7 to 15 grams of gas in a pint size (0.47 litre) can will be sufficient. A mixture of 4 to 5 grams of nitrous oxide and 2 grams of "Freon 115" has been found to be satisfactory for 12 oz. (0.36 litres) of mix in the pint can.

In any case, enough soluble gas is charged into the can to ensure continuous whipping action by the expanding gas as the container valve is opened. Even though the "Freon" gases mentioned above are not very soluble, yet when the can is shaken, enough becomes suspended in the mix, aided by the emulsifier, to expand and whip the mix on discharge.

By the term "maximum of corresponding standard preparations", as employed in the claims, is meant known ice cream, ice milk, and sherbet mixes having respectively, the commercially usual maximum total solids content disclosed hereinabove.

Various mixes according to the invention are presented below by way of illustration, but the invention is not limited thereto.

EXAMPLE 1

Vanilla Ice Cream Mix (10% Butterfat)

	% by weight
Heavy Cream (36% fat)	27.8
Skim Milk Powder	14.
Cane Sugar	10.
Corn Syrup Solids (42% Dextrose Equivalent)	6.6
Sodium Caseinate	0.4
Lactose	2.
Locust Bean Gum	0.13
Carrageenin	0.02
Emulsifier ("TM100VS")	0.2
Calcium Sulphate	0.2
Vanilla Extract	0.0225
Vanilla Oleoresin (6 oz. strength)	0.0225
Water	38.605
	100.00 %

"6-oz. strength" is a measure of the vanillin concentration in the oleoresin and is the quantity dissolved in 1 gallon of aqueous alcohol; this gives what is termed a "1-fold concentration".

The total solids content of this mix, excluding the vanilla flavoring agent, was 45.02%.

This composition was pasteurized at 160°F. for 30 minutes and homogenized. Then, 10 oz. of this mix was placed in a 16 oz. container, and a mixture of 30% "C-115 Freon" aud 70% nitrous oxide was introduced into the container at a pressure of about 100 lbs./sq. in. (7.05 kg./sq. cm.) at room temperature. The mix was then placed in a refrigerator for a short period of time, and then discharged from the aerosol container into a suitable dish. The soft ice cream product obtained, despite an overrun of over 200%, was firm, had the smooth feel and consistency of a mousse, and was found to

have a pleasing taste and flavor, comparable to commercial vanilla ice cream. On freezing, it suffered no noticeable loss of volume and no crystallization of sugar was observed. The ice cream product was not heavy, soggy, or sticky. It had a pleasing lightness without being fluffy, and had a desirable "chewiness".

EXAMPLE 2

Vanilla Ice Cream Mix (16% Butterfat)

	% by weight
Heavy Cream (40% butterfat)	40.
Skim Milk Powder	12.35
Cane Sugar	9.
Corn Syrup Solids (42% D.E.)	5.6
Sodium Caseinate	0.4
Lactose	2.
Locust Bean Gum	.11
Carrageenin	.02
Emulsifier ("TM100VS")	.2
Vanilla Extract	0.0225
Vanilla Oleoresin ("6 oz. strength")	0.0225
Calcium Sulphate	.2
Water	30.075
	100.00 %

The total solids content of the mix, exclusive of the vanilla flavouring agent, was 48%.

The mix was treated as described in Example 1, and a product was obtained which was similar to the product of Example 1, with the taste, body, texture and general palatability of commercial ice cream of equivalent fat content, all despite an overrun of about 240% and an increase in solids content of only about 10%.

EXAMPLE 3

Ice Milk Mix (6% Butterfat)

	% by weight
Heavy Cream (40% butterfat)	15.
Skim Milk Powder	15.
Cane Sugar	10.
Corn Syrup Solids (42% Dextrose Equivalent)	6.6
Lactose	2.
Sodium Caseinate	.4
Locust Bean Gum	0.13
Carrageenin	0.02
Calcium Sulphate	0.2
Emulsifier ("TM 100VS")	0.2
Vanilla Extract	0.0225
Vanilla Oleoresin ("6 oz. strength")	0.0225
Water	50.405
	100.00 %

The total solids content, exclusive of the vanilla flavouring agent, was 41.33%.

The mix was treated as described in Example 1.

The product obtained from such a mix was comparable in taste and body to commercial ice milk, even though the overrun was about 210% from a pressurized container with the above-described mixture of "Freon" gas and nitrous oxide at a pressure of about 100 lbs./sq. inch (7.05 kg./sq.cm.).

EXAMPLE 4

Diabetic Ice Cream Mix

	% by weight
Heavy Cream (40% butterfat)	40.
Condensed Skim Milk (30% serum solids)	26.27
Sorbitol Solution (70%)	20.
Sodium Caseinate	0.4
Calcium Cyclamate	0.04
Saccharin	0.01
Locust Bean Gum	0.12
Carrageenin	0.02
Calcium Sulphate	0.2
Emulsifier ("TM 100VS")	0.2
Vanilla Extract	0.0225
Vanilla Oleoresin ("6 oz. strength")	0.0225
Water	12.695
	100.00 %

The total solids content of the mix was 40.95%.

The mix was treated as in Example 1, and the diabetic product obtained was comparable in taste and body to commercial ice cream. The overrun was about 205%, but neither the soft product discharged by the aerosol container nor the frozen product was fluffy or foamy.

EXAMPLE 5

Sherbet Mix

	% by weight
Heavy Cream (40% butterfat)	5.
Skim Milk Powder	4.74
Cane Sugar	30.
Corn Syrup Solids (42% Dextrose Equivalent)	12.
Locust Bean Gum	0.14
Carrageenin, Type 2	0.02
Calcium Sulfate	0.2
Emulsifier ("TM 100VS")	0.2
Citric Acid	0.35
Water	47.35
	100.00 %

The total solids content of the mix was 48%.

The mix was treated as described in Example 1. The product so obtained was comparable to the commercial standard sherbet.

There can be added to the mix a synthetic fruit flavouring agent in the usual small proportion, or a suitable quantity of a strained natural fruit juice, the amount of water being reduced correspondingly. The properties of the frozen product can be modified by varying the proportions of the skim milk powder and of the sugars.

EXAMPLE 6

Dietetic Ice Cream Mix

	% by weight
Heavy Cream (40% butterfat)	10.
Skim Milk Powder	18.
Crystalline Sorbitol	10.
Gum Arabic	8.
Locust Bean Gum	0.1
Emulsifier ("TM 100VS")	0.2
Calcium Sulfate	0.2
Calcium Cyclamate	0.25
Vanilla Extract	0.0225
Vanilla Oleoresin ("6 oz. strength")	0.0225
Water	53.205
	100.00 %

The total solids content of the mix, excluding the vanilla flavouring agent, was 41.27%.

The mix was treated as in Example 1. The refrigerated mix was discharged from the pressurized container at an overrun of over 200%. The mass was firm and smooth and showed no loss in volume on freezing; it was comparable in taste and body to commercial dietetic ice cream.

EXAMPLE 7

Chocolate Ice Cream Mix

	% by weight
Heavy Cream (36% butterfat)	27.8
Skim Milk Powder	11.0
Cane Sugar	13.
Corn Syrup Solids (42% D.E.)	6.
Sodium Caseinate	0.4
Calcium Sulphate	0.2
Emulsifier ("TM 100VS")	0.2
Locust Bean Gum	0.12
Carrageenin	0.02
Cocoa	3.5
Vanillin	0.05
Water	37.71
	100.00 %

On discharge of the above mix from a refrigerator-cooled aerosol container, which was at about 100 lbs./sq. inch (7.05 kg./sq. cm.), the propellant and whipping agent consisting of a mixture of "Freon" gas and nitrous oxide, there was obtained a chocolate mousse-like product resembling soft ice cream of extreme smoothness and excellent flavour and which, despite its considerably lower solids content per quart (or litre) than commercial chocolate ice cream, maintained its shape for a considerable time at room temperature, remained free from bleeding, was highly palatable with good body, and on freezing, retained its original volume and had a body, texture, rate of melting in the mouth and general palatability at least equal in all respects to a high grade of ice cream. The overrun was about 235%.

I am aware of the Artificial Sweeteners in Food Regulations, 1969, and insofar as my invention relates to the manufacture for sale in the United Kingdom and/or sale in the United Kingdom of food products containing a cyclamate I make no claim to use the invention in contravention of the law.

WHAT I CLAIM IS:—

1. A confectionery food package comprising a food mix packaged in an aerosol dispenser under the pressure of a gaseous propellant partially dissolved in the mix, wherein the food mix is a substantially homogeneous aqueous suspension containing the components of ice cream, ice milk or sherbet, the solids content of the mix consisting essentially of an edible fat, milk solids non fat, and a sweetening material, with smaller proportions of one or more emulsifying, stabilizing, thickening or flavouring agents, the total solids content of the ice cream, ice milk or sherbet mix being in the range of respectively, 43% to 54%, 37% to 47% and 42% to 59%, the gas being dissolved in the mix to such a degree that on discharge from the dispenser in the chilled condition the mix is whipped by the expanding and escaping gas to an overrun of at least 160% in the case of ice cream and ice milk mixes or of at least 80% for sherbet mixes and yields an expanded mass which can be frozen to form an ice cream, ice milk or sherbet type of product.

2. A package according to claim 1, wherein the mix is an ice cream mix containing 10% to 16% of edible fat, 11% to 17% of milk solids non-fat, and 17% to 25% of sweetening agents.

3. A package according to claim 1, wherein the mix is a sherbet mix containing 1% to 3% of edible fat, 3% to 7% of milk solids non-fat and 42% to 52% of sugar.

4. A package according to claim 1, wherein the mix is an ice milk mix containing 2% to 7% of edible fat, 15% to 17% of milk solids non-fat, and 18% to 24% of sweetening material.

5. A package according to any of claims 1 to 4, wherein the edible fat is butter fat.

6. A package according to any of claims 1 to 5, wherein said mix contains 0.1% to 0.5% of stabilizer and 0.1% to 0.2% of emulsifier.

7. A package according to claim 1 or

claim 2, wherein the mix is an ice cream mix and includes a small proportion of calcium sulphate.

8. A package according to claim 7, wherein the sweetening agent includes lactose in a proportion of substantially 2% of the mix.

9. A package according to any of the preceding claims wherein the sweetening material includes one or more artificial sweeteners.

10. A confectionery food package comprising a pressurized valved container having therein an aqueous ice cream mix together with propellant gas under pressure, a part of the gas being dissolved in the mix, the composition and solids content of the mix being such that on discharge of the mix from the container, it is whipped with an overrun of at least 160% into a form-retaining mass of mousse-like body and smoothness of texture which can be frozen to a product of the type of ice cream without separation of liquid and without any substantial production of stockiness or gumminess, wherein the mix contains the following components in the proportions stated:—

Fat	10% to 16%
Skim Milk Powder	11% to 17%
Sweetening Agents	17% to 25%

together with one or more stabilizing, emulsifying and flavouring agents, the balance of the mix being substantially all water.

11. A package according to claim 10, wherein the mix contains the following components in the proportions stated:—

Fat	10 % to 16 %
Skim Milk solids	12.35% to 14 %
Cane sugar	9 % to 10 %
Corn syrup solids (42% Dextrose Equivalent)	5.6 % to 6.6%
Lactose	2 %

together with one or more stabilizing, emulsifying and flavouring agents, the solids content of the mix being at least 43% by weight.

12. A package according to claim 10, wherein the mix contains the following components in substantially the stated proportions:—

Fat	10 % to 16%
Skim Milk Powder	11 %
Cane sugar	13 %
Corn Syrup Solids (42% Dextrose Equivalent)	6 %
Cocoa	3.5%

together with stabilizing and emulsifying agents, and the balance being substantially all water.

13. A food package comprising a pressurized valved container having therein an aqueous diabetic ice cream mix together with propellant gas under pressure, a part of the gas being dissolved in the mix, the composition and solids content of the mix being such that on discharge of the mix from the container it is whipped with an overrun of at least 160% into a form-retaining mass of mousse-like body and smoothness of texture which can be frozen to a product of the type of ice cream, the mix containing the following components in substantially the stated proportions:—

Heavy Cream (40% butterfat	30 % to 40%
Condensed skim milk (30% serum solids)	26 % to 30%
Sorbitol solution (70%)	20 %
Synthetic sweetening agents	0.05%

together with one or more stabilizing, emulsifying and stiffening agents, the balance of the mix being substantially all water.

14. A food package comprising a pressurized valved container having therein an aqueous dietetic ice cream mix together with propellant gas under pressure, a part of the gas being dissolved in the mix, the composition and solids content of the mix being such that on discharge of the mix from the container, it is whipped with an overrun of at least 160% into a form-retaining mass of mousse-like body and smoothness of texture which can be frozen to a product of the type of ice cream, the mix containing the following components in substantially the stated proportions by weight:—

Heavy cream (40% butterfat)	10%
Skim milk powder	18%
Crystalline Sorbitol	10%
Gum arabic	8%

together with one or more stabilizing, emulsifying, flavouring and stiffening agents, the balance of the mix being substantially all water.

15. A package according to any of claims 10 to 14, wherein the pressure in the container and the composition of the mix are such that an overrun of from 160% to 250% is obtained.

16. A package according to claim 15, wherein the overrun is from 200% to 250%.

17. A package according to any of claims 10 to 16, wherein the mix includes 0.1% to 0.5% of stabilizer and 0.1% to 0.2% of emulsifier.

18. A package according to any of claims 10 to 17, wherein the mix contains small

proportions of an emulsifying agent, a stabilizing agent, and calcium sulphate.

19. A package according to claim 18, wherein the sweetening agent includes lactose in an amount of substantially 2%.

20. A package containing a mix as claimed in any of claims 10 to 19, wherein the mix includes a small proportion of calcium sulphate.

21. A package as claimed in any of claims 10 to 20, wherein the sweetening material comprises one or more artificial sweeteners.

22. A package according to any of the preceding claims, wherein the gaseous propellant is monochlorpenta-fluoro ethane, octafluoro-cyclobutane, nitrous oxide or carbon dioxide, or a mixture of two or more of these gases.

23. A package according to any of the preceding claims, wherein the mix includes small proportions of sodium caseinate and of an edible, slightly-soluble calcium salt.

24. A food package as claimed in any of claims 1, 10, 13 and 14 and substantially as herein described.

25. The method of preparing a mix as defined in any of the preceding claims, in a frozen condition, which comprises introducing the mix into a container provided with a valve-controlled discharge nozzle, charging the container with a partially soluble gaseous propellant, chilling the container and discharging the mix from the container to provide an expanded, form-retaining mass with an overrun of at least 160% in the case of ice cream and ice milk mixes or of at least 80% for sherbet mixes, and freezing such mass to form an ice cream, ice milk or sherbet type of product.

26. A process for the manufacture of a dispensing unit for the substantially instantaneous preparation of a form-retaining mass of whipped mix of the type of ice cream which is capable of being frozen to form a product of good body, texture and palatability, which comprises packaging a homogeneous aqueous ice cream mix in a valved container, and placing the interior of the container under gas pressure with the aid of a gas which is soluble in the mix, said mix containing cream, skim milk solids, sweetening material, an emulsifier, a stabilizing agent, a flavouring agent and water, the total solids content of the mix ranging from 43% to 54%, so that upon opening of the container valve, after chilling the container, the mix is discharged with simultaneous whipping thereof to an overrun of 160% to 250% by the expansion of the gas dissolved therein to yield a form-retaining expanded mass which is capable of being frozen to an ice cream type of product.

27. The method of preparing a frozen confection composed of an ice cream mix as defined in any of claims 1 to 25, which comprises introducing the mix into a container provided with a valve-controlled discharge nozzle, charging the container with a partially soluble gaseous propellant, chilling the container and discharging the mix from the container to provide an expanded, form-retaining mass with an overrun of at least 160%, and freezing this mass to form an ice cream type of product.

28. A process for the manufacture of a dispensing unit for the substantially instantaneous preparation of a form-retaining mass of whipped mix of the type of ice cream which is capable of being frozen to form a product of good body, texture, and palatability, which comprises packaging a homogeneous aqueous ice cream mix in a valved container, and placing the interior of the container under gas pressure with the aid of a gas which is soluble in the mix, wherein the mix contains 10% to 16% of butterfat, 11% to 17% of skim milk solids, from 17% to 25% of sweetening material, and small amounts of an emulsifier, a stabilizing agent and a flavouring agent, the total solids content of the mix being from 43% to 54%, the balance being substantially water, so that upon opening of the container valve, after chilling the container, the mix is discharged with simultaneous whipping thereof to an overrun of from 160% to 250% by the expansion of the gas dissolved in the mix to yield a form-retaining expanded mass which is capable of being frozen to form an ice cream type of product.

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